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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/827,307	04/06/2001	Tadahiro Ohmi	P 280043 EL00026CDC	4153

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EXAMINER	
ALEJANDRO MULERO, LUZ L	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/827,307	OHMI ET AL.	
	Examiner	Art Unit	
	Luz L. Alejandro	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 3-11 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ohmi et al., U.S. Patent 6,719,875.

Ohmi et al. shows the invention substantially as claimed including a plasma processing apparatus comprising: a first electrode 102; a first power source 104 operably coupled to the first electrode; a substrate configured to be subjected to a plasma, the substrate being positioned on the first electrode; a magnetic field generator 110 configured to apply a static magnetic field to a surface of the substrate to which the plasma process is applied; a second power source 109; and a disk-shaped auxiliary electrode 107 provided on an outer periphery of said first electrode to excite the plasma in a vicinity of the auxiliary electrode, the auxiliary electrode having substantially planar front and back surfaces, wherein the auxiliary electrode extends substantially parallel to a surface of the first electrode, and wherein the auxiliary electrode is operably connected to the second power source, and wherein said first electrode and said auxiliary electrode are supplied with radio frequency signals having different phases to establish a flow of electrons substantially parallel to the front surface of said auxiliary electrode and substantially parallel to the back surface thereof (see figs. 1-17 and their descriptions).

Furthermore, note that Ohmi et al. discloses that an insulating material is formed on the surface of the auxiliary electrode (see col. 7-lines 46-53). It should be noted that the word on, according to the Webster's II-New College Dictionary, is used to indicate a position above and in contact with. Therefore, according to this definition the Ohmi et

al. reference anticipates the instant claimed invention. Alternatively, it would have been an obvious choice of design to one having ordinary skill in the art at the time the invention was made, to cover the auxiliary electrode only on the front surface because there is not evidence that the degree of coverage of the auxiliary electrode would significantly affect the overall performance of the plasma processing apparatus.

Concerning claims 3 and 11, note that the substrate has a surface positioned at a level substantially equal to a level of the front surface of the auxiliary electrode.

Regarding claim 4, note that the magnetic field generator comprises a dipole ring magnet (see col. 7-lines 51-53).

With respect to claim 5, note that the first electrode is supplied with a first radio frequency and said auxiliary electrode is supplied with a second radio frequency and wherein the first and second radio frequencies are equal to each other and have different phases thereof.

Moreover, note that concerning claim 6, that the first electrode is supplied with a first radio frequency and said auxiliary electrode is supplied with a second radio frequency and said second radio frequency is higher than said first radio frequency.

Regarding claim 7, note that the process performed with the apparatus includes: applying a static magnetic field to a surface of the substrate; exciting plasma on a back surface of the auxiliary electrode; and supplying radio frequency signals with different phases to the first and auxiliary electrode, thereby creating a difference in plasma density between a front surface of the auxiliary electrode and a back surface of the auxiliary electrode to cause electrons in the plasma to drift from the front surface of said

auxiliary electrode to the back surface thereof and from the back surface of said auxiliary electrode to the front surface thereof, and to cause the electrons in the plasma to circulate substantially parallel to the front surface of the auxiliary electrode and substantially parallel to the back surface thereof.

Claims 1 and 3-11 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ohmi et al., JP 2000-40695 (foreign equivalent of Ohmi et al., U.S. Patent 6,719,875).

Ohmi et al. shows the invention substantially as claimed including a plasma processing apparatus comprising: a first electrode 102; a first power source 104 operably coupled to the first electrode; a substrate configured to be subjected to a plasma, the substrate being positioned on the first electrode; a magnetic field generator 110 configured to apply a static magnetic field to a surface of the substrate to which the plasma process is applied; a second power source 109; and a disk-shaped auxiliary electrode 107 provided on an outer periphery of said first electrode to excite the plasma in a vicinity of the auxiliary electrode, the auxiliary electrode having substantially planar front and back surfaces, wherein the auxiliary electrode extends substantially parallel to a surface of the first electrode, and wherein the auxiliary electrode is operably connected to the second power source, and wherein said first electrode and said auxiliary electrode are supplied with radio frequency signals having different phases to establish a flow of electrons substantially parallel to the front surface of said auxiliary

electrode and substantially parallel to the back surface thereof (see figs. 1-17 and their descriptions).

Furthermore, note that Ohmi et al. discloses that an insulating material is formed on the surface of the auxiliary electrode (see col. 7-lines 46-53). It should be noted that the word on, according to the Webster's II-New College Dictionary, is used to indicate a position above and in contact with. Therefore, according to this definition the Ohmi et al. reference anticipates the instant claimed invention. Alternatively, it would have been an obvious choice of design to one having ordinary skill in the art at the time the invention was made, to cover the auxiliary electrode only on the front surface because there is not evidence that the degree of coverage of the auxiliary electrode would significantly affect the overall performance of the plasma processing apparatus.

Concerning claims 3 and 11, note that the substrate has a surface positioned at a level substantially equal to a level of the front surface of the auxiliary electrode.

Regarding claim 4, note that the magnetic field generator comprises a dipole ring magnet (see col. 7-lines 51-53).

With respect to claim 5, note that the first electrode is supplied with a first radio frequency and said auxiliary electrode is supplied with a second radio frequency and wherein the first and second radio frequencies are equal to each other and have different phases thereof.

Moreover, note that concerning claim 6, that the first electrode is supplied with a first radio frequency and said auxiliary electrode is supplied with a second radio frequency and said second radio frequency is higher than said first radio frequency.

Regarding claim 7, note that the process performed with the apparatus includes: applying a static magnetic field to a surface of the substrate; exciting plasma on a back surface of the auxiliary electrode; and supplying radio frequency signals with different phases to the first and auxiliary electrode, thereby creating a difference in plasma density between a front surface of the auxiliary electrode and a back surface of the auxiliary electrode to cause electrons in the plasma to drift from the front surface of said auxiliary electrode to the back surface thereof and from the back surface of said auxiliary electrode to the front surface thereof, and to cause the electrons in the plasma to circulate substantially parallel to the front surface of the auxiliary electrode and substantially parallel to the back surface thereof.

It is noted that applicant submitted a translation for the foreign priority document, however, if an English language translation is required, it must be filed together with a statement that the translation of the certified copy is accurate (see MPEP 201.13). Note that the English language translation of the foreign priority document, filed on 11/18/03, does not include the statement that the translation of the certified copy is accurate.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., U.S. Patent 6,232,236 in view of Ohmi et al., WO 98/39500 and further in view of Ohmi et al., U.S. Patent 6,719,875 or JP 2000-40695 (foreign equivalent).

Shan et al. shows the invention as claimed including a plasma processing method performed in a plasma processing apparatus comprising: a first electrode 215 on which a substrate 164 subjected to a plasma process is placed and a first power

source 240 operably connected to the first electrode; a magnetic field applying means 270 for applying a magnetic field to a surface of the substrate to which the plasma process is applied; an auxiliary electrode 220 provided on an outer periphery of said first electrode and connected to a second power source 242 to excite plasma in the vicinity of the auxiliary electrode, the radio frequency signals having different phases (see Fig. 2 and col. 3-line 30 to col. 5-line 10).

Shan et al. does not expressly disclose a plasma processing method including applying a static magnetic field. Ohmi et al. discloses applying a static magnetic field for achieving uniform processing results while allowing for a miniaturized apparatus (see abstract and paragraph bridging pages 1 and 2). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Shan et al., as to as apply a static magnetic field in order to achieve uniform processing results while allowing for a miniaturized apparatus.

Both Shan et al. and Ohmi et al. '500 do not expressly disclose the auxiliary electrode having a front surface covered by the insulating material and a back surface not covered by the insulating material. Ohmi et al. '875 and '695 discloses that an insulating material is formed on the surface of the auxiliary electrode (see col. 7-lines 46-53). It should be noted that the word on, according to the Webster's II-New College Dictionary, is used to indicate a position above and in contact with. In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Ohmi et al. '500 so as to include the claimed auxiliary electrode structure because this allows for

adequate protection of the electrode. Alternatively, note that it would have been an obvious choice of design to one having ordinary skill in the art at the time the invention was made, to cover the auxiliary electrode, in the apparatus of Shan et al. modified by Ohmi et al. '500 and Ohmi et al. '875 or '695, only on the front surface because there is not evidence that the degree of coverage of the auxiliary electrode would significantly affect the overall performance of the plasma processing apparatus.

Furthermore, note that by supplying radio frequency signals with different phases to the first electrode and the auxiliary electrode of the apparatus of Shan et al. modified by Ohmi et al. '500 and Ohmi et al. '875 and '695, will create a difference in plasma density between the front surface of the auxiliary electrode and the back surface of the auxiliary electrode that will cause electrons in the plasma to drift as claimed.

Response to Arguments

Applicant's arguments filed 08/17/06 have been considered but are not deemed persuasive. Applicant's arguments filed 08/17/06 have been fully considered but they are not persuasive. The response to the request for information under 37 CFR 1.105 is noted and has been considered. Applicant argues that the Ohmi et al. '875/'695 references simply disclose an insulating film "on its surface" and therefore one of ordinary skill in the art would conclude that the insulating film was applied to the entire surface of the electrode and not to only the top side of the electrode and not to the back side. However, as stated in the above rejections, Ohmi et al. '875/'695 discloses that an insulating material is formed on the surface of the auxiliary electrode (see col. 7-lines

46-53). It should be noted that the word on, according to the Webster's II-New College Dictionary, is used to indicate a position above and in contact with. Therefore, according to this definition, the Ohmi et al. '875/'695 reference anticipates the instant claimed invention. Furthermore, it should be noted that applicant uses the exact same terminology when referring to the claimed invention (see, for example, page 15-lines 4-6 of the specification), and there is a common inventorship with the Ohmi et al. '875 or '675 references. Therefore, it would be a reasonable conclusion that in both the instant application and the Ohmi et al. '875 and '695 references the insulating film is formed on only the front surface as claimed. Alternatively, it would have been an obvious choice of design to one having ordinary skill in the art at the time the invention was made, to cover the auxiliary electrode only on the front surface because there is not evidence that the degree of coverage of the auxiliary electrode would significantly affect the overall performance of the plasma processing apparatus.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Luz L. Alejandro
Primary Examiner
Art Unit 1763

October 30, 2006